

# INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

## CHAPTER 7

### THREATENED AND ENDANGERED SPECIES

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### THREATENED AND ENDANGERED SPECIES

#### SECTION 1: INTRODUCTION

7100. ENDANGERED SPECIES ACT. The Endangered Species Act of 1973 requires the development and implementation of programs to protect and conserve any species of plant and wildlife listed as threatened or endangered by the Secretary of the U. S. Department of the Interior. The habitat as well as the individuals of the listed species must be protected. As a steward of federally owned land, Marine Corps Base, Quantico, Virginia (MCB) must comply with the requirements of this act. It is also Marine Corps policy to cooperate with Virginia to protect any Virginia listed endangered species and to provide consideration of such species during the National Environmental Policy Act (NEPA) planning process.

7101. OBJECTIVES. Objectives of the MCB Threatened and Endangered (T&E) species management program are to: (1) identify T&E species occurring, or potentially occurring, aboard the installation, (2) perform field surveys and inventories needed to determine the presence, distribution, and population status of known species; (3) identify habitat that requires protection or special consideration; (4) develop specific management strategies to protect existing populations of T&E species; (5) develop and implement a monitoring program to track changes in population levels of T&E species over time; (6) maintain liaison with other state and federal agency personnel when actions may affect a known endangered species and (7) educate base personnel about endangered species and applicable laws.

7102. THREATENED AND ENDANGERED SPECIES SURVEYS. Natural Resources and Environmental Affairs (NREA) Branch personnel have conducted annual bald eagle surveys at MCB since 1982. The Division of Natural Heritage, Virginia Department of Conservation and Recreation (VDCR), conducted surveys to identify rare and T & E species at MCB in 1990 and 1991 (VDCR 1992). Further inventories for rare species were done by the DNH from 1998-1999 (Fleming 2000, Chazal 2000). The following paragraphs summarize the findings of rare and T&E species at MCB.

#### 1. Birds

a. The bald eagle, federally listed as threatened and state listed as endangered, has made a significant comeback from problems caused by pesticide pollution. Bald eagles have been nesting on Chopawamsic Creek since 1984. Since that time, nests have also been found in the Quantico Creek and Beaverdam Run watersheds. Bald eagle habitat requirements and management recommendations are discussed in Section 2 of this chapter.

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b. A population of the state rare least bittern (*Ixobrychus exilis*) was documented aboard MCB during field surveys conducted on 2 August 1991. A total of 3 least bitterns were observed in the lower Chopawamsic Creek area at two locations. Only 8 breeding records are known for the species in Virginia, including Chopawamsic Creek. Although the least bittern is secretive and a comprehensive survey has not been conducted, existing data indicate that Chopawamsic Creek may be an important habitat for this species.

2. Mammals. A single specimen of the State Special Concern star-nosed mole (*Condylura cristata*) was collected during the VDCR survey. This species is generally associated with water and occurs primarily in floodplains, riparian zones, fens, and bogs. However, the specimen documented for MCB was taken from an upland pine-hardwood site. As this was not considered a representative habitat for the species, it was assumed that the individual was dispersing to or from a riparian site (VDCR 1992).

3. Reptiles and Amphibians. A field survey of reptiles and amphibians at MCB was conducted from June 1990 through May 1991 (Mitchell 1991). No T & E species were documented during this investigation. Mitchell (1998) conducted further amphibian studies at MCB from 1995-1997 and again detected no rare species.

4. Fishes. Stream fishes were surveyed in 1988 by the U. S. Fish and Wildlife Service (USFWS 1988) and in 1998 and 1999 by George Mason University (Kelso 2000). These surveys did not detect the presence of any T&E fish species.

### 5. Plants

a. Three populations of small whorled pogonia (*Isotria medeoloides*), a listed threatened species, were found during the 1992 VDCR study. Since the discovery of the small whorled pogonia at MCB, searches for the plant have been conducted annually in areas being reviewed for any land disturbance, including construction activities and timber harvests. SWP stems have now been located at 15 locations on the base. Management considerations for the SWP are provided in Section 3 of this chapter.

b. A population of Carolina fanwort (*Cabomba caroliniana*) was located at the Chopawamsic Creek Marsh site, which is believed to be the only extant site known for Virginia. There is no legal status for this species but it was recommended for special concern at the 1989 Virginia Endangered Species Symposium.

c. The VDCR report identified several rare plants not found during the survey that have the potential of occurring at Quantico: the sensitive joint-vetch (*Aeschynomene virginica*), federally listed as threatened; one-sided wintergreen (*Pyrola secunda*); large-fruited sanicle (*Sanicula trifoliata*); Parker's pipewort (*Eriocaulon parkeri*);

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and vetchling (*Lathyrus palustris*). None of these species has been found on MCB property.

d. In 1998 and 1999, VDCR was contracted to inventory plants in the fire maintained dud impact area, Training Area 9A. During the study, two state rare plants, Buxbaum's sedge (*Carex bubaumii*) and red milkweed (*Asclepias rubra*), were found and three rare, fire-maintained natural community types were found. The communities identified were the Coastal Plain/Piedmont Seepage Bog, Oak-Hickory Woodland/Savanna and Piedmont Prairie (Fleming 2000).

e. In 2002, VDCR found a population of the federally listed endangered harperella (*Ptilimnium nodosum*) growing in the bed of Aquia Creek. This species is discussed in Section 5.

6. Invertebrates. A population of the federally listed endangered dwarf wedgemussel (*Alasmidonta heterodon*) was found in Aquia Creek during the 1992 survey. Life history and management of this species is discussed in Section 4 of this chapter. An inventory of moths and butterflies was completed in 1999. No rare or T&E species were found but a number of county distribution records were obtained.

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#### SECTION 2: BALD EAGLE

##### 7200. LIFE HISTORY AND HABITAT REQUIREMENTS

###### 1. Breeding biology

a. Bald eagles are monogamous and are thought to establish pair bonds for several years, and possibly for life. Males and females are not able to breed successfully until they are four years old (Nye 1983). The percentage of eagles that actually breed at this age is probably quite low, especially in areas with high nesting populations where young birds have difficulty competing for available nest sites (Green 1985).

b. Adult bald eagles return to build and repair nests from November to January in the Chesapeake Bay region. One to three eggs are usually laid in February through March, but may be laid as early as January. The eggs hatch from mid-March into April, and sometimes early May, after 34 to 36 days of incubation (Cline 1983, Green 1985). The young birds fledge from 70 to 98 days after hatching and usually remain dependent on the parents for an additional 60 to 80 days while learning to hunt. Mated birds do not necessarily produce eggs every year. Factors implicated to result in nonbreeding include chemical contamination, disturbance, poor physical condition due to severe weather, shortages in prey during the nonbreeding period, and low prey availability at the beginning of the nesting season (Green 1985).

c. Population Status. In Virginia, the number of active bald eagle nests has grown from 45 in 1982 to over 400 in 2005. Due to similar population increases throughout the bald eagle's range, the species was downlisted from endangered to threatened status in 1995 and has been proposed for delisting under the Endangered Species Act of 1973. The eagle is also receiving and will continue to receive protection under the Bald and Golden Eagle Protection Act (BGEPA) of 1940 and the Migratory Bird Treaty Act of 1918.

d. Mortality. Major causes of eagle mortality and reproductive failure have historically included organochlorine pesticides, shooting, human disturbance, and habitat loss. Lead poisoning, polychlorinated biphenyls, and electrocution from power lines have also been implicated. Human disturbance is often cited as a major cause of population declines, but there is limited quantitative data on human impacts. Activities associated with logging, mining, construction, recreation, and other land uses are known to disturb eagles in some instances, but the degree of impact depends on a variety of factors including the type of action, intensity, frequency, duration, and timing. Bald eagle sensitivity to human disturbance

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appears to be variable among breeding pairs. Pairs that historically nested in more "pristine" areas, that received minimal disturbance, may be more prone to adverse impacts from human activities near a nest site. In contrast, birds that have historically nested near humans and human disturbance may be less affected by human activities. The factor most consistently responsible for declines in nesting and wintering birds in recent years is habitat loss (Green 1985).

### 2. Feeding Habits

a. Bald eagles feed primarily on fish throughout their range but are opportunistic and will consume a variety of other food items if available (Green 1985). Both live and dead fish are taken; dead fish comprise 25-67 per cent of all fish captured. Eagles are only able to capture live fish near the surface or in very shallow water. Species most commonly reported in the diets of eagles include catfish (*Ictalurus* spp.), carp (*Carpinus carpio*), and gizzard shad (*Dorosoma cepedianum*) (Green 1985).

b. Waterfowl and seabirds have occasionally been reported as being more important than fish in the diets of bald eagles but most birds taken are sick, dead, or injured individuals. Remains of numerous species of mammals have been found at eagle nests, but regular use of mammalian prey is thought to occur only when such prey is readily available. Prey items collected beneath bald eagle nests in the Chesapeake Bay region included birds (29 species), mammals (6 species), and turtles (5 species) (Cline 1983).

### 3. Habitat Requirements

a. Nesting Habitat. Nearly 100% of all nests are within 2 miles and most are within 0.5 mile of a coastal area, river, lake, or other body of water. Proximity to water reflects the dependence of eagles on fish, waterfowl, and sea birds as primary food items (McEwan and Hirth 1979, Andrew and Mosher 1982, Green 1985). Some bald eagle breeding territories have been used for over 50 years (Cline 1985).

b. Bald eagles nest primarily in tall trees that extend above the surrounding forest. The nest height averages 90 ft (Cline 1985). The particular types of trees vary regionally, but one or two species representing similar physical characteristics usually support most of the nests in a particular locale. Two characteristics are common to almost all eagle nests: (a) a clear flight path to at least one side of the nest, and (b) excellent visibility, often with an unobstructed view of water (Green 1985). In the Chesapeake region most trees are about 100 yards from breaks in the forest such as field edges, timber cuts, bodies of water, or roads.

c. Most nest trees have a stout limb structure or a branching pattern that is suitable for supporting a large nest near the treetop. Some nests are built in the tops of dead trees, but most are in the upper branches of a living tree, with foliage above the nest providing



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shade or protection during inclement weather (Green 1985). The nest is a large mass of sticks about 3 ft deep and 5 ft across. Some eagles will use the same nest every year, whereas others will alternate from year to year among two to five different nests in their breeding territory (Cline 1985). Nests that are used over an extended period often become immense in size. Only one nest is used for rearing young in a particular year. The other sites, referred to as alternate or supernumerary nests, are often used as feeding platforms or perches (Green 1985).

d. Wintering Habitat. Most wintering areas are associated with open water but inland areas will be used if dependable food resources are present. The availability of suitable roost sites is also critical to wintering bald eagles. Communal roost sites ranging in size from 0.8 to 628 acres and from 0.16 to 15 miles away from food sources have been reported (Chester et al. 1990). Eagles will arrive at a night roost just before dusk and leave the site immediately after daybreak (Cline 1985). Roosts may also be occupied for significant periods during the day, especially when weather conditions are inclement. Communal roosting by several eagles is common.

e. Roost Sites. Communal roosts may also be used in the late summer and during migration. In July 1981, over 40 birds were observed just inland and along several miles of shoreline of the Potomac River in King George County, Virginia. Roost trees are usually the oldest and largest trees within a stand, and most have stout horizontal limbs and an open branching pattern that allows room for takeoff and landing. Visibility to the surrounding area is unobstructed, and there is little or no human activity in the immediate vicinity. The microclimate at roost sites has also been reported to be warmer than that of the surrounding area. The distance between roost sites and feeding areas is highly variable, suggesting that proximity to food is less critical than other roost site characteristics (Green 1985).

### 4. Census Techniques

a. Aerial Surveys. Aerial surveys, using a fixed-wing aircraft or helicopter, are most practical for locating nests. Although helicopter flights are more expensive, they are perhaps a more effective means of surveying nesting eagles in specific regions. Eggs and nestlings can also be counted much more accurately from a helicopter. Another advantage of aerial censusing is the ability to locate birds that have pioneered into new habitat.

b. Winter surveys. Basic procedures used to census eagles, are searches of specific habitats (e.g., lakes, coastal areas, and riparian zones) to count birds that congregate in these habitat types. When conducting a winter census, it must be realized that wintering habitat is less predictable than nesting habitat because a greater diversity of habitat types tend to be used by migrant and wintering

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birds. The counts can be done by aerial surveillance, ground or boat transportation, but aerial surveys are by far the most efficient.

5. Management. Bald eagle protection guidelines for Virginia are contained in USFWS/VDGIF (2000). The following guidelines are excerpted from that document. Activities and projects that do not conform with these recommendations must be referred to VDGIF/USFWS for consultation to ensure compliance with state and federal laws.

### a. Guidelines for Nest Sites

(1) Primary Management Zone. This is the area 750 feet in radius around an occupied nest. The following activities within this zone should not occur at any time:

(a) land clearing, clear cutting, mining, and other habitat modification activities;

(b) development of residential, recreational, agricultural, commercial, or industrial structures, power lines, roads, trails, or any other construction activity;

(c) use of chemicals toxic to wildlife, such as pesticides and herbicides.

The following activities should not occur during the breeding/nesting season (December 15-July 15) unless the nest is determined to be unoccupied in a particular year:

(a) maintenance of existing buildings and roads;

(b) use of motorized vehicles and heavy equipment;

(c) aircraft flyovers within 1000 vertical feet of the ground;

(d) human entry and activities, including recreation, such as hiking, camping, picnicking, hunting, fishing, boating, jet skiing, etc;

(e) loud noise generating activities, including blasting.

Limited selective timber harvest to within 300 feet of the nest tree, after consultation with the VDGIF/USFWS, may be possible outside the breeding/nesting season, if a forest canopy is maintained.

(2) Secondary Management Zone. This is the area from 750 feet to 1,320 feet in radius around an occupied nest. Most activities within this zone should be restricted during the breeding/nesting season, and allowable activities should be determined by the VDGIF/USFWS on a case-by-case basis. Development and vegetation clearing should be minimized and line-of-sight vegetation buffers to

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the nest should be maintained. The following activities within this zone should generally not occur at any time:

(a) development of multi-story buildings; high density housing; large commercial, industrial, or agricultural facilities, high traffic roads; and facilities that would generate loud noise;

(b) use of chemicals toxic to wildlife, such as pesticides and herbicides.

The following activities should not occur during the breeding/nesting season (December 15 - July 15), unless the nest is determined to be unoccupied in a particular year:

(a) aircraft flyovers within 1000 vertical feet of the ground;

(b) construction activities;

(c) recreational activities that generate loud noise, such as motorized boats, jet skis, etc.;

(d) other loud noise generating activities, including blasting.

Outside the breeding/nesting season, most other activities can be conducted within the secondary management zone as determined on a case-by-case basis by VDGIF/USFWS.

(3) Nest/Nest Tree Removal. The eagle nest and the tree/structure in which it is located cannot be removed as long as any portion of the nest remains in the tree/structure.

(4) Abandoned Nest. For three consecutive nesting seasons after the last season in which the nest was occupied (and any portion of the nest is present), the primary and secondary management zones guidelines should be followed. In April of the third year after the nest was last occupied, a determination of nest abandonment should be made by VDGIF/USFWS.

b. Guidelines for Eagle Concentration Areas. Management zones, for communal night roosting sites and documented high use shoreline foraging areas, should generally be applied the same as for nests. Seasonal occupation varies depending on the specific roost or shoreline area, but is generally defined as summer (May 1 - September 30) and winter (November 1 - February 28). Appropriate human use and building/land disturbance restrictions should be determined on a case-by-case basis by VDGIF/USFWS.

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### 7201. MCB HISTORICAL INFORMATION

1. Bald eagle nesting has occurred on Base property since 1984. Nests on the Base are monitored by the Fish, Wildlife and Agronomy Section, using both ground and aerial surveys to search for nests. The College of William and Mary's Center for Conservation Biology monitors nest production in the Quantico vicinity by aerial overflight of the tidal Potomac River and its tributaries. Figure 7-1 shows nest locations and nest protection zones. A description of Quantico nest locations follows:

a. Chopawamsic Creek Nest (VA# ST-98-03). This site is approximately 0.5 mile inland from open water in the lower portion of the creek and 2.5 miles inland from the Potomac River. At least four different nest trees have been used since 1984. The production of one fledgling was documented for the 1988 and 1991 seasons but production failed in 1989 and 1993. Adverse weather (snow and torrential rains) during the incubation period was implicated for failures. From 1994 through 1996, inclusive, two eagles were fledged each nesting season. In 1997, a storm destroyed the nest and eggs. In 1998, two nest sites were located during the annual overflight but only one of the nests was active. Two young fledged each year from 1998 - 2001, 2003 and 2004. The nest failed in 2002, 2005, and 2006.

b. Quantico Creek Nest (VA# PW-96-01). This nest was located in a mature oak-poplar stand along a ridgeline about 300 meters inland from Quantico Creek. Two eagles fledged the nest in 1997. The nest was occupied but unsuccessful in 1998 and has been abandoned since that time.

b. Flat Run Nest (VA# ST-00-02). In 2000, a nest was discovered in Training Area 9D along Flat Run. The nest is located in a poplar tree along the shoreline of a large beaver pond complex in Training Area 9D. The area is located within the military training complex west of the Guadalcanal area. A protection zone was posted with signs at a minimum distance of 750 feet from the nest. The number of young fledged in 2000 was undetermined. One eagle fledged in 2001 and 2004. The nest failed in 2005 and was abandoned in 2006.

c. Tank Creek Nest (VA# ST-00-01). Eagles have nested on private property just south of Tank Creek near Training Area 3. Although the nest is not on Base property, the nest protection zone affects land management on the Base. Informal consultation has been done with the USFWS concerning the chronology and scale of timber removal activities in Training Area 3.

d. Butler Stadium Nest (VA# PW-03-02). In 2003, a nest was found in the Mainside Area adjacent to Butler Stadium. The proximity of this nest to Base housing renovation led to informal consultations with the USFWS. All conflicts between nest protection and construction activities were mitigated through the informal consultation

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process. The nest successfully fledged 1-2 young each year from 2003-2006.

2. From 1986 to 2006, the Fish, Wildlife and Agronomy Section used helicopter airlifts to search for nests and conduct late winter eagle counts along the major watersheds. On average, about eight eagles have been seen during these late January - late February flights. Areas frequented by eagles include Lunga Reservoir, Breckinridge Reservoir, Smith Lake, Chopawamsic Creek, Quantico Creek, and the Potomac River shoreline (Figure 7-1). These areas are considered to be the primary eagle feeding and roosting areas at Quantico (Stamps, pers obs).

3. Special Protection Area. In 1993, following the VDCR recommendation that the Chopawamsic Creek Marsh be designated for special protection and management consideration, the Commanding General, MCB, conferred Protected Natural Area designation upon the lower Chopawamsic Creek Basin. The Chopawamsic Creek Basin was determined to be important to the Base's bald eagle populations as well as to many other wetland dependent fish and wildlife species.

### 7202. MANAGEMENT RECOMMENDATIONS

#### 1. Shoreline Habitat Protection

a. The primary threats to the continued existence of the bald eagle at Quantico would be the development of shoreline habitat, increased human activity near shorelines, and degradation of water quality. The shorelines identified in Figure 7-1 should remain undeveloped for the purpose of maintaining eagle roosting and feeding habitat.

b. Construction should be planned as far from the shoreline habitats as possible and best management practices should be used to control stormwater discharges.

c. Timber harvesting practices should ensure the retention of mature timber along shorelines for feeding perches, nest sites, and roosts.

2. Nest Surveys. Annual nest surveys should be conducted in coordination with the VDGIF to maintain records of eagle breeding success. Census data should be sent to the DGIF.

3. Nest Protection Zones. Primary nest protection zones should be marked around all nests where there is encroachment concern and personnel should be kept out of the zones from 15 December - 15 July. Consultation with the VDGIF/USFWS should be done if flights within 1,000 vertical feet of an active eagle nest are required. If a nest site remains inactive for three consecutive years, the VDGIF/USFWS may be consulted about removing the protection zone around the nest site.

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Even after the nest is abandoned, the tree and nest remnants remain protected under the Bald and Golden Eagle Protection Act.

4. Consultation with the VDGIF/USFWS should be conducted for any activities that do not comply with the guidelines cited in paragraph 7200.5.

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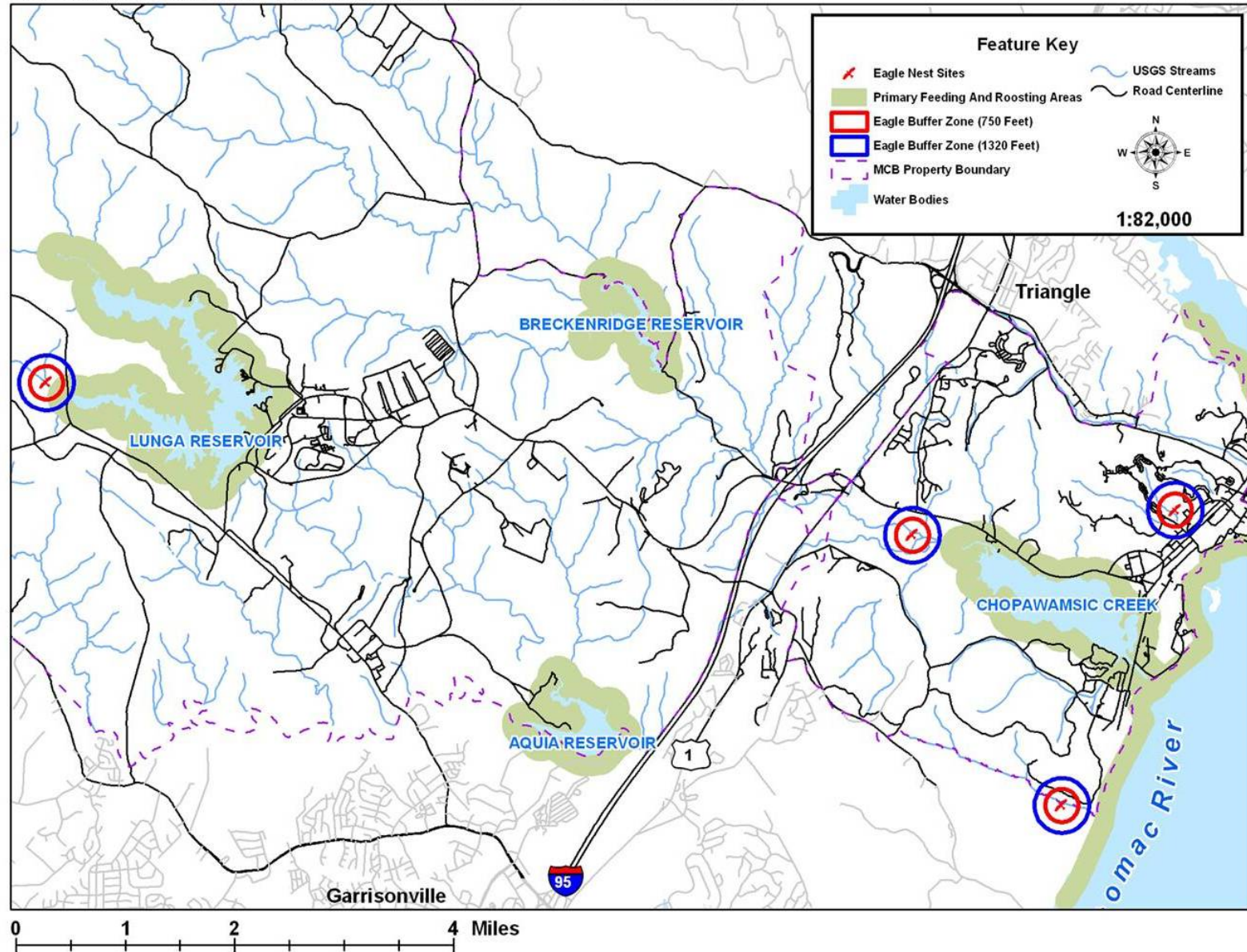
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MCB Quantico: Eagle Nest Locations And Management Zones - April 28th, 2006



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#### SECTION 3: SMALL WHORLED POGONIA

##### 7300. LIFE HISTORY AND HABITAT REQUIREMENTS.

1. General Description. Descriptive information about the life history of the small whorled pogonia (SWP; *Isotria medeoloides*) is from USFWS (1992). A member of the orchid family, it is a small, perennial, herbaceous plant. The species is distinguished by the glaucous, pale-green whorl of 4-6 leaves (usually 5) at the apex of a thickened, pale-green stem. Plants range in height from 2-8 inches and are solitary; however, stems may be found clustered together in colonies. The SWP may be distinguished from its relative the common (or large) whorled pogonia (*Isotria verticillata*) by the reddish-purple coloration along the stem of the common whorled pogonia. The Indian cucumber root (*Medeola virginiana*) also appears superficially similar to the SWP but differs in flower and in the thin, brown stem that usually exhibits cobwebby hairs.

2. Reproduction. Flowers of the SWP are yellowish-green with a greenish-white lip (0.5-1.0 inches in length) and are borne on a short stalk at the apex of the stem. Flowering usually occurs about May 15<sup>th</sup> at Quantico, with the flowers persisting 4-10 days. The flowers are self-pollinating. If fertilization occurs, a green capsule (0.5-1.5 inches in length) will appear that may persist into early July. Flowering plants are generally 5-7 inches tall (apparently there is some correlation between plant size and reproduction). As with most orchids, the seeds are very small and contain no stored food for the embryo.

3. Dormancy. The SWP possesses a subterranean rootstock that may persist for years. It may lay dormant for one to several years or may produce stems annually, from over-wintering buds at the apex of the rootstock. Assessment of colony viability can only be made from several years worth of observations of stem emergence.

4. Habitat. The SWP grows in mixed-deciduous or mixed-deciduous/coniferous forests that are generally in second- or third-growth successional stages. Most sites share several common characteristics to include: sparse to moderate ground cover, and a relatively open understory canopy. There is a mycorrhizal association in this species; however, no specific species of fungus has been identified to date. It is presumed that the mycorrhizal association is with a fungus that metabolizes cellulose and or lignin. The presence of a mycorrhizal fungus is also considered to be essential in the germination of seeds and the early growth of the embryo into a photosynthesizing plant.

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### 7301. MCB HISTORICAL INFORMATION.

1. The locations of SWP colonies are shown at Figure 7-2. SWP are found mostly in hardwood stands consisting primarily of American beech (*Fagus grandifolia*), yellow poplar (*Liriodendron tulipifera*), assorted oaks (*Quercus* spp.), and maples (*Acer* spp.) along north or east facing slopes along drainage channels. These stands are secondary growth of 40+ years maturity. Dense canopy, little understory, very little to no herbaceous cover, and deep moist leaf litter characterizes these sites. Observations of these colonies reveal that many plants are near rotting stumps and logs. Indian cucumber root is often observed near sites where SWP are found and therefore seems to indicate suitable site conditions for SWP. A few stems have been found on hardwood ridges or elevated streamside terraces that are not considered typical of "prime" habitat.

2. Monitoring Techniques. Known colonies on Base are monitored annually from the peak date of blooming, May 15, to July 15. Personnel physically search for and record, on a sketch map of the colony site, each stem of SWP and note whether it is in reproductive or vegetative state. Distances of plants from recognized reference points are noted on the sketch map. Any changes in habitat such as defoliation, beaver cutting or fire are documented. The results of annual stem counts are shown at Table 7-1. If sites do not produce stems for 10 consecutive years, they can be designated historic sites (Eric Davis, VA office USFWS, pers. comm.).

3. Survey Techniques. All construction and land management projects on Base that require disturbance of mature forest stands are subject to NEPA review and require that the site be surveyed to detect the presence or absence of the SWP. The USFWS recommends that SWP surveys in northern Virginia occur after blooming and be conducted between June 1 and July 15. Personnel approved by the USFWS for SWP surveys must carefully inspect all suitable habitat within the project area. Early successional forest habitats are excluded from survey. Any stems/colonies located are mapped using GIS/GPS technology and the findings are forwarded to the NEPA Coordination Section, NREA Branch, for inclusion in the NEPA documentation for the proposed action.

4. Disturbance History. The majority of the colony sites are in woodlands where they are isolated from routine military training activities. Disturbance concerns on base have included gypsy moth defoliation, beaver flooding, fire, and timber harvest. While most colonies have not been subject to these events, the few cases are discussed below.

a. John's Colony. This SWP colony is located in Training Area 16C about 200 feet north of an abandoned powerline right-of-way and 150 yards west of a gravel road. Marines use the area for defensive tactical training. Although training activities are focused near the road, in 1996, units dug foxholes in the vicinity of the plant stems. To prevent a future occurrence, a single strand barbed wire fence and

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"Natural Resources Protection Zone" signs were installed to keep personnel out of the site. A 50-foot buffer was maintained between the fence and the plant stems. The zone has effectively prevented encroachment into the zone.

### b. Chestnut Branch

(1) In 1991, a small beaver dam and pond occurred at the downstream edge of the SWP colony. The recommendation of the USFWS (USFWS 1991) was not to remove beavers unless flooding of the plants was imminent. Although some understory clearing occurred due to beaver cuttings, beavers moved downstream and did not impact the overstory or hydrologic conditions at the site.

(2) The watershed area upstream of the colony is used for low intensity military training; historic signs of wild fires and bivouac sites are present. In the fall, 2000, training exercises produced a wild fire that burned about 50% of the ground litter in the colony site. Although the fire was mostly contained on the north side of Chestnut Branch, firefighters used bulldozers to drag smoldering snags away from the creek and disturbed soil near the colony site.

(3) In 1991, the USFWS did an on-site evaluation of the potential impacts of a proposed timber sale within the watershed of this colony. The USFWS concluded that the timber harvest would not impact the SWP but recommended the following guidelines for land-altering activities (USFWS 1991):

(a) Contact the VDCR and the USFWS when these activities are planned within  $\frac{1}{4}$  mile and within the watershed of a known SWP population, or within 300 feet of a population but in a different watershed.

(b) Delineate ecological protection boundaries on Base natural resources maps. These sites may be posted or otherwise marked on the ground, at the Installation's discretion.

c. TBS Colony. This site is located along a footpath in forestland south of The Basic School and 200 feet east of the Nuclear Biological Chemical training facility. The operation of the training facility does not appear to impact the site because the training does not involve the placement of personnel into the surrounding woodlands. Use of the trail did pose a potential trampling hazard to the plants so a fence with protection zone signs was established around this colony area.

d. C-Demo Colony. This colony is located within the controlled access zone for the C-Demolition Range in Training Area 5A. The colony is located north of the firebreak that encircles the detonation area. The ground-cover layer consists of features common to most other sites, dead wood and leaf litter, but in addition has rock outcrops and moderate herb layer. In March 1999, a fire escaped from

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the C-Demo range and burned across the litter surface in the colony site. The number of stems has ranged from four to eight during the four years the site has been monitored. The growing season after the fire the number of stems was four and the following year the number was seven. The fire does not appear to have had adverse effects on the number of stems and did not impact the overstory cover. Many species of the SWP plant family, Orchidaceae, respond favorably to fire but the long-term response of SWP is unknown.

e. Gypsy Moth. The gypsy moth was at epidemic levels on Base from 1991-1995. There was considerable defoliation and tree mortality along ridges, particularly of white and chestnut oaks. No colony sites were directly impacted by a serious defoliation. At the Cricket Frog Pond colony, spraying of *Bacillus thuriengensis* (BT) was done to control damage within the Quantico Creek watershed. There was not a significant amount of defoliation in the colony area but there was some gypsy moth activity. Some canopy damage from wind throw may have slightly increased light penetration in the colony area and there appears to have been some increase in the amount of seedling growth on the forest floor. Per Table 1, there has been a significant decline in the number of stems at this site but it is unknown if it is due to environmental disturbance or if it is typical for this species.

### 7302. MANAGEMENT RECOMMENDATIONS

1. Notification. The VDCR and the Virginia Field Office of the USFWS should be notified whenever land-altering activities are planned within ¼ mile and within the watershed of a known SWP population, or within 300 feet of a population but in a different watershed.

2. Annual Inspection. Known colonies can be visited annually at Quantico from May 15 to July 15 to count the number of stems and make notes of any disturbances or changes that have occurred in or near the colony.

#### 3. Protection Zone

a. Fencing and signs should be used to mark the protection zone around colonies where there is a significant threat from trampling or ground disturbing activities. Natural resources maps that show the protection zones should be provided to the organizations responsible for fire fighting.

b. Only signs should be used to mark a protection zone around a colony in remote areas. The purpose is to alert fire-fighting personnel to the presence of an SWP site so they can avoid the colony if they have to install firebreaks.

4. Surveys. Any woodland areas of the Base that are proposed sites for construction, logging, or other disturbances must be identified at least one year in advance of disturbance to ensure that a SWP search

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can be done during the growing season prior to the project. The SWP survey is required to complete the NEPA review process. Failure to conduct the SWP search in a timely manner can result in project delays. Per USFWS guidelines, SWP surveys are valid for two years.

### 7303. REFERENCES

U.S. Fish and Wildlife Service. 1991. Letter re: Endangered species comments on units 5 and 6 timber sale. Div Ecol. Services. Chesapeake Bay Field Office Annapolis, Maryland. 2 pp.

\_\_\_\_\_. 1992. Small Whorled Pogonia (*Isotria Medeoloides*) Recovery Plan, First Revision. Newton Corner, Massachusetts. 75 pp.

Table 7-1. Small Whorled Pogonia stem counts. \*Historic colony with no stems recorded for 10 consecutive years.

Colony Name	Year 1991 - 2006															
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Cricket Frog Pond	33	12	16	29	16	16	5	7	2	3	2	5	1	4	4	3
North Branch	23	20	25	17	14	16	26	22	24	7	8	6	2	5	11	18
Chestnut Branch	4	0	5	4	2	2	7	6	3	2	1	1	0	1	4	3
Matthew's Gnarly Tree	-	-	-	1	0	1	0	0	0	1	2	6	3	3	75	39
TBS	-	-	-	-	3	2	8	8	11	10	2	6	3	2	8	12
John's	-	-	-	-	8	3	11	12	4	5	1	5	3	0	1	0
Ammo	-	-	-	-	2	1	1	0	0	0	0	0	0	0	0	0
Hotpatch*	-	-	-	-	1	0	0	0	0	0	0	0	0	0	0	0
C-Demo	-	-	-	-	-	-	8	5	4	7	2	2	1	3	2	9
Leadline	-	-	-	-	-	-	3	0	0	0	0	0	0	0	0	0
Russell Rd.	-	-	-	-	-	-	9	6	7	2	3	3	1	2	4	4
Washboard Road	-	-	-	-	-	-	-	-	24	6	11	5	1	2	6	7
Ben's Colony	-	-	-	-	-	-	-	-	-	1	1	1	0	0	0	0
South Fork	-	-	-	-	-	-	-	-	-	-	1	1	1	2	2	2
Long Branch	-	-	-	-	-	-	-	-	-	-	-	6	4	4	4	11
TOTAL	60	32	46	51	46	41	80	66	79	44	34	47	20	28	121	108

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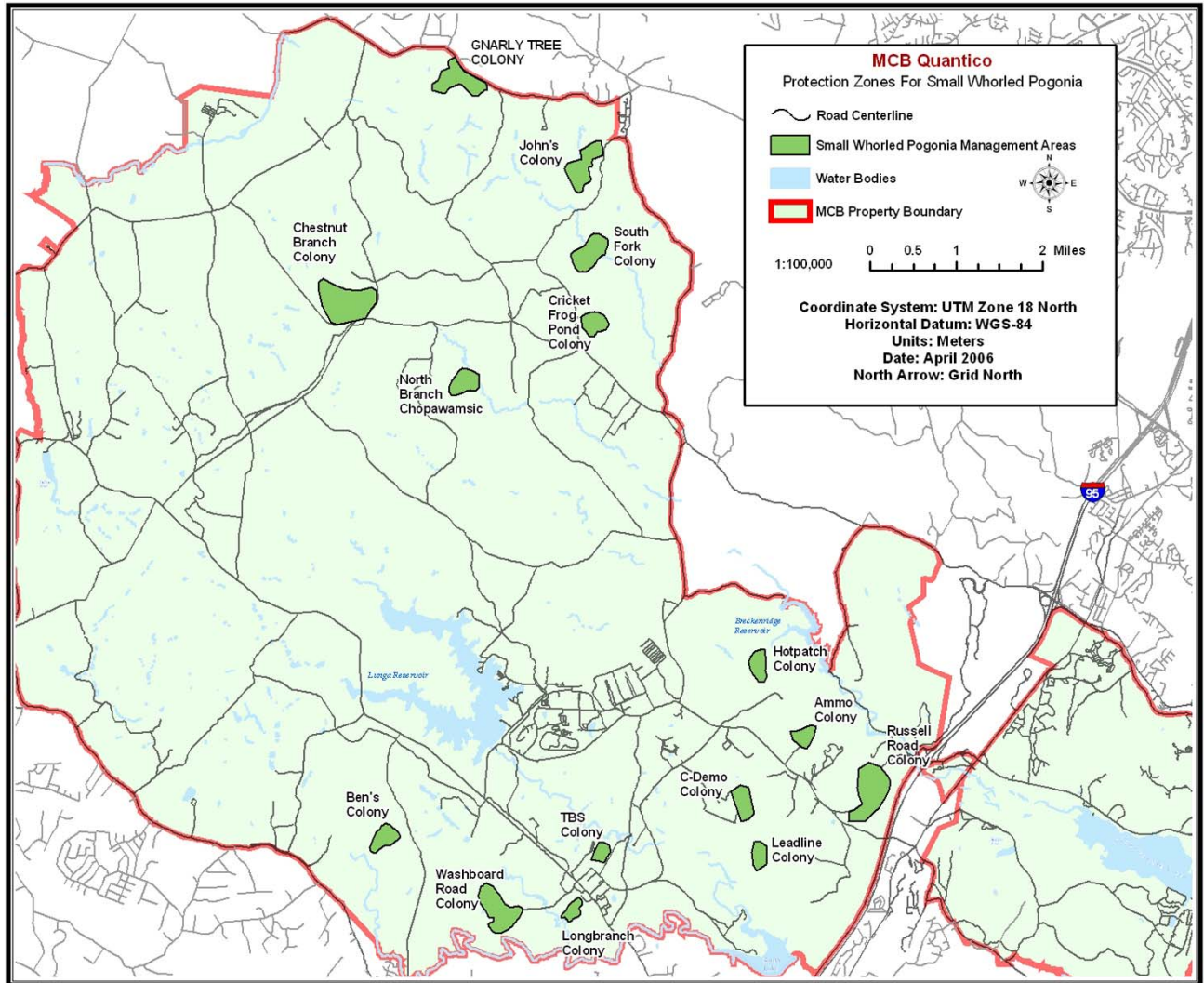


Figure 7-2.--Protection zones for small whorled pogonia.

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## CHAPTER 7

### THREATENED AND ENDANGERED SPECIES

#### SECTION 4: DWARF WEDGEMUSSEL

##### 7400. DESCRIPTION, LIFE HISTORY, AND HABITAT REQUIREMENTS

1. Description. The dwarf wedgemussel (DWM) is a relatively small species, seldom exceeding 38 mm in length. The shell outline is more or less ovate or trapezoidal. The chief distinguishing characteristic of this species is that its right valve possesses two lateral teeth and the left valve only has one tooth. All other North American freshwater mussels having lateral teeth are opposite. There is a degree of sexual dimorphism. The outline of the female shell is shorter, swollen posteriorly, and more trapezoidal, whereas the male shell is more compressed, ovate and elongate (USFWS 1993).

2. Life History. The reproductive cycle of this species is similar to that of other freshwater mussel species. During the spawning period, August 15 - October 15, males discharge sperm into the water. Females take in the sperm during siphoning. Within the female, the eggs are fertilized and pass into water tubes in the gills, where they mature into glochidia. The mature glochidia are released into the water from April 15 - June 15, where they must attach to an appropriate species of fish. If the glochidia attach to a suitable host, they encyst and eventually metamorphose to the juvenile stage. When metamorphosis is complete, they drop to the streambed as juvenile mussels (USFWS 1993).

3. Habitat. This species lives on muddy sand and gravel bottoms in creeks and rivers of varying sizes, in areas of slow to moderate current and little silt deposition (USFWS 1993).

##### 7401. MCB HISTORICAL INFORMATION

1. The VDCR (1992) found DWM's in a 0.5 mile reach of Aquia Creek extending from above the pool at the old Route 643 crossing upstream to the Route 610 bridge (Figure 7-3). Eight live mussels were observed between the pool and Cannon Creek, and 14 individuals were found as fresh or relict shells. Three live individuals were recorded in the shallow areas below the culvert pool below the old Route 643 crossing (VDCR 1992).

2. Michaelson and Neves (1995) reported finding dozens of animals during their study of this population in 1991 and 1992 and transported a number of individuals to Virginia Tech for laboratory studies. The tessellated darter (*Etheostoma olmstedi*), found in MCB watersheds, was confirmed as a host fish for DWM glochidia. Analysis of shell sections suggested that DWM in Aquia Creek reach a maximum length of

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45.26 mm and have a theoretical maximum lifespan of 14 years. In laboratory habitat suitability experiments, the DWM preferred the finer substrates offered but showed little preference for lotic versus lentic flow regimes.

3. Michaelson and Neves (1995) noted in 1992 that there appeared to be a large die-off (49 fresh-dead individuals). Strayer (1994) conducted a range-wide assessment of major DWM populations and concluded that the Aquia Creek population was the least robust of the studied populations. Only one live DWM was found in the reach between the old Route 643 bridge and Cannon Creek, a stretch where Michaelson and Neves (1995) had reported dozens of individuals. Strayer reported that between Cannon Creek and the Route 610 bridge, the population had a moderate density ( $0.03/\text{m}^2$ ) and contained some young animals. He estimated the Aquia Creek population to be comprised of about 50 individuals.

4. In 1998, VDCR zoologists (Chazal 2000) spent three field-days searching for DWM between route 643 and route 610. No DWM were found below the confluence of Cannon Creek and Aquia Creek. Only two live individuals and two relict shells were found upstream of the confluence. The only other live mussel species seen were *Elliptio complanata* (Eastern elliptio) and the Asian clam (*Corbicula fluminea*). Michaelson and Neves (1995) had also observed *Elliptio icterina* (variable spike) and *Strophitus undulatus* (squawfoot). There appears to have been a significant decline in native mussel populations. The reasons for this decline are unknown. There has been significant new construction upstream in the Aquia Creek watershed off-Base; the Asian clam is a non-native invasive species and there were significant drought years when Aquia Creek was reduced to small isolated pools. The farmland just south of the DWM site was developed with single family homes in 2000. It appears that the developer left an intact 100 foot vegetated buffer zone between the construction and Aquia Creek in keeping with the Chesapeake Bay Act riparian protection zone requirements.

5. Field surveys were again conducted in 2003 (Roble 2004). Despite 18 man-hours of intensive sampling, no live specimens and only one shell fragment of this species was located. Roble (2004) suggests that it is too early to conclude that the dwarf wedgemussel has disappeared entirely from this section of Aquia Creek. However, it is clear that significant declines have occurred in the native mussel fauna. Reduced water quality, sedimentation and erosion from upstream construction and development are cited as probable causes of this decline.

### 7402. MANAGEMENT RECOMMENDATIONS

#### 1. Water Quality Protection

- a. The VDCR recommended that the special protection area shown at

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Figure 7-3 be established for MCB property. The site includes Aquia Creek, its associated riparian zone, and adjacent steeply sloped uplands. Also included are portions of Cannon Creek, a tributary stream that enters Aquia Creek at the location of the DWM colony. Any proposed disturbances of the stream channel and flow conditions should be referred to the USFWS for comment.

b. Timber management activities in the vicinity of the creek and adjacent riparian zone should be administered to avoid gross disturbance to the vegetation or soils.

c. If the use of pesticides for controlling gypsy moths is required in this area, the following buffer zones are recommended; (a) 150-ft wide buffer for BT, and (b) 300-ft wide buffer for Dimilin. The Virginia Division of Natural Heritage, VDCR, highly recommends that BT be used instead of Dimilin because BT is not known to harm freshwater mussels or other aquatic invertebrates whereas negative effects have been reported for Dimilin.

2. Population Monitoring. Sampling to identify the presence and number of DWM's in this population should be conducted at least every five years by a qualified surveyor who has necessary state and federal permits. The sampling should be coordinated with the VDGIF.

### 7403. REFERENCES

- Chazal, A. C. 2000. Zoological surveys for the dwarf wedgemussel and Lepidoptera at Marine Corps Base, Quantico, Virginia. Natural Heritage Technical Report 00-05. Va. Dept. of Cons. and Rec., Div. of Nat. Heritage. Richmond, Va. 17 pp. plus appendices.
- Michaelson, D. L. and R. J. Neves. 1995. Life history and habitat of the endangered dwarf wedgemussel *Alasmidonta heterodon* (Bivalvia:Unionidae). J. N. Am. Benthol. Soc. 14(2):324-340.
- Roble, S. M. 2004. Status survey of the dwarf wedgemussel (*Alasmidonta heterodon*) in Aquia Creek, Marine Corps Base, Quantico, Virginia, 2003. Natural Heritage Technical Report 04-03. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. 8 pp.
- Strayer, D. L. 1994. A range-wide assessment of populations of the dwarf wedgemussel (*Alasmidonta heterodon*). Inst. of Ecosystem Studies. Millbrook, NY. 59 pp.
- U.S. Fish and Wildlife Service. 1993. Dwarf wedgemussel *Alasmidonta heterodon* recovery plan. Hadley, Massachusetts. 52pp.
- VDCR. 1992. A natural heritage inventory - Marine Corps Base Quantico, Stafford County, Virginia. Natural Heritage Technical Report 92-25. Va. Dep. Cons. and Rec., Div. of Nat. Heritage, Richmond, Va. 41 pp.

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Dwarf Wedge Mussel Location & Water Quality Protection Zone

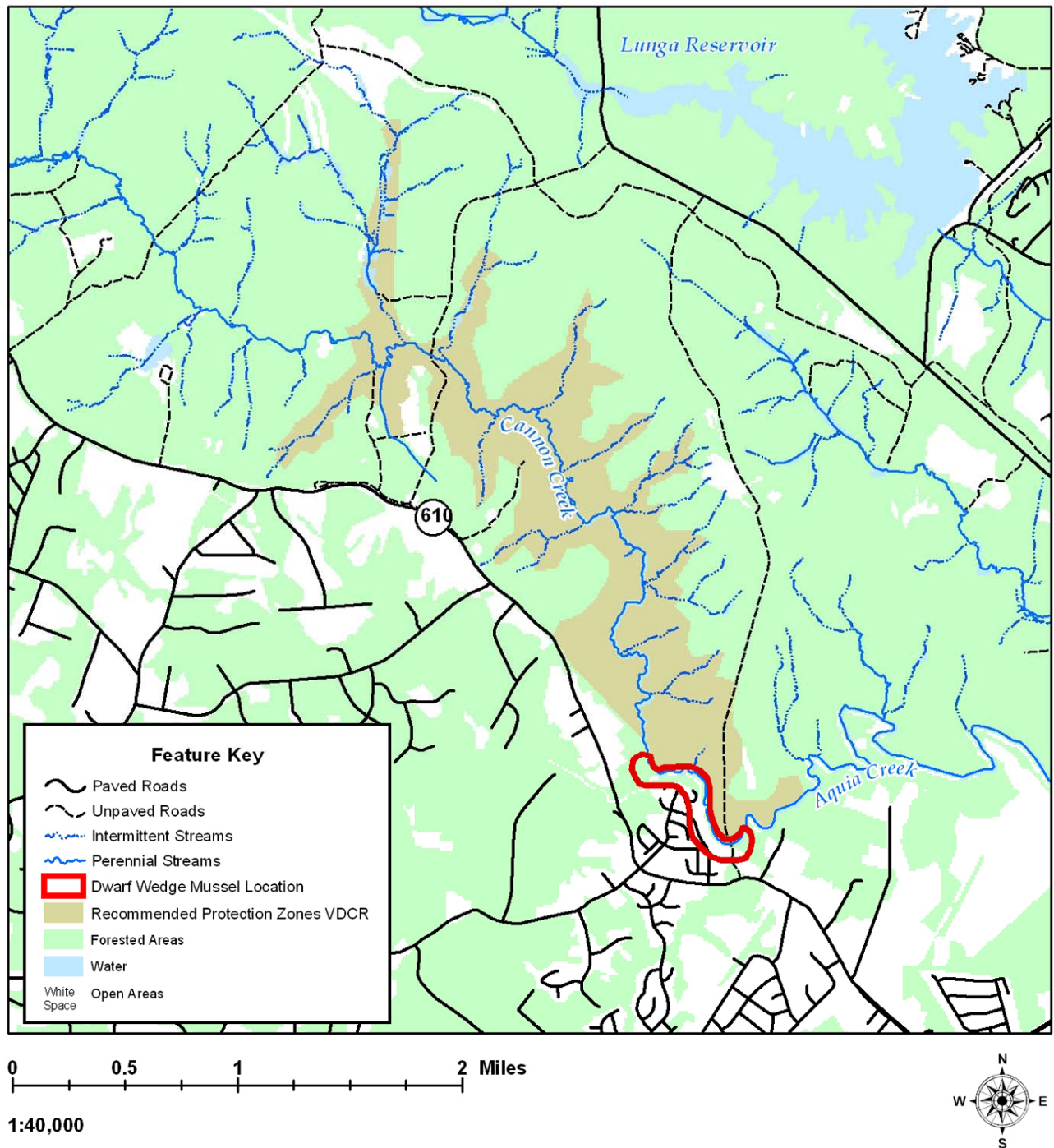


Figure 7-3. Dwarf wedge mussel location and protection zone.

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## CHAPTER 7

### THREATENED AND ENDANGERED SPECIES

#### SECTION 5: HARPERELLA

##### 7500. DESCRIPTION, LIFE HISTORY, AND HABITAT REQUIREMENTS

1. General Description. Harperella (*Ptilimnium nodosum*) is an annual herb belonging to the carrot family (Apiaceae). In 1988, the plant was listed as a federal endangered species. In 2004, it was listed as an endangered species under the Virginia Endangered Plant and Insect Species Act. It grows to a height of 40 - 100 centimeters. Leaves are hollow, quill-like structures. The flowers are similar in appearance to Queen Anne's Lace, a common roadside plant (USFWS 1990).

2. Reproduction. It produces small white flowers in clusters called umbels. The flowering period is May - June. The plant germinates, grows and flowers in one season. Seedling germination has not been observed, but the fall die-back of adults suggests that germination occurs in late spring (USFWS 1990).

3. Habitat. This plant is found in rocky substrate along edges of coastal plain ponds and seasonally flooded streams (USFWS 1990). In the northern part of its range, it grows on sandy or gravelly shoals or in bedrock crevices of clear, swift-flowing streams or rivers. It appears to favor sunny areas and is often associated with the herb water willow (*Justicia Americana*) (Maddox and Bartgis 1990).

##### 7501. MCB HISTORICAL INFORMATION.

1. The VDCR found the harperella site along Aquia Creek in 2002 (Belden 2002). The site is located about 0.9 mile northwest of Garrisonville and about 0.4 mile southwest of the junction of Aquia Creek and Onville Road (Route 641). It is estimated that there were 350 ramets within a 10 by 20 meter area extending from the northern bank to about the middle of the creek.

2. MCB contracted for the survey of all suitable riverine habitat on the Base in 2003. No assessment could be done in 2003 due to high water, so the contract was modified to perform the work in 2004. No new populations of harperella were found in 2004 (Belden 2004). The Aquia Creek population had declined from about 350 in 2002 to only 20 ramets in 2004. It is believed that the high water levels and accompanying increase in flood scouring may have accounted for the decline. In 2005, the VDCR found increasing numbers of ramets and it appeared that the population was rebounding (Townsend, pers. comm.).

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7502. MANAGEMENT RECOMMENDATION. The site will be monitored annually during the growing season to make population size counts and note hydrologic conditions.

### 7503. REFERENCES

Belden, A. Jr. and N. E. VanAlstine. 2002. Surveys for small whorled pogonia (*Isotria medeoloides*) in Timber Compartments 9, 10, and 25 in 2002 at Marine Corps Base, Quantico, Virginia. Natural Heritage Tech. Rep. 02-22. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond. 24 pp. plus appendix.

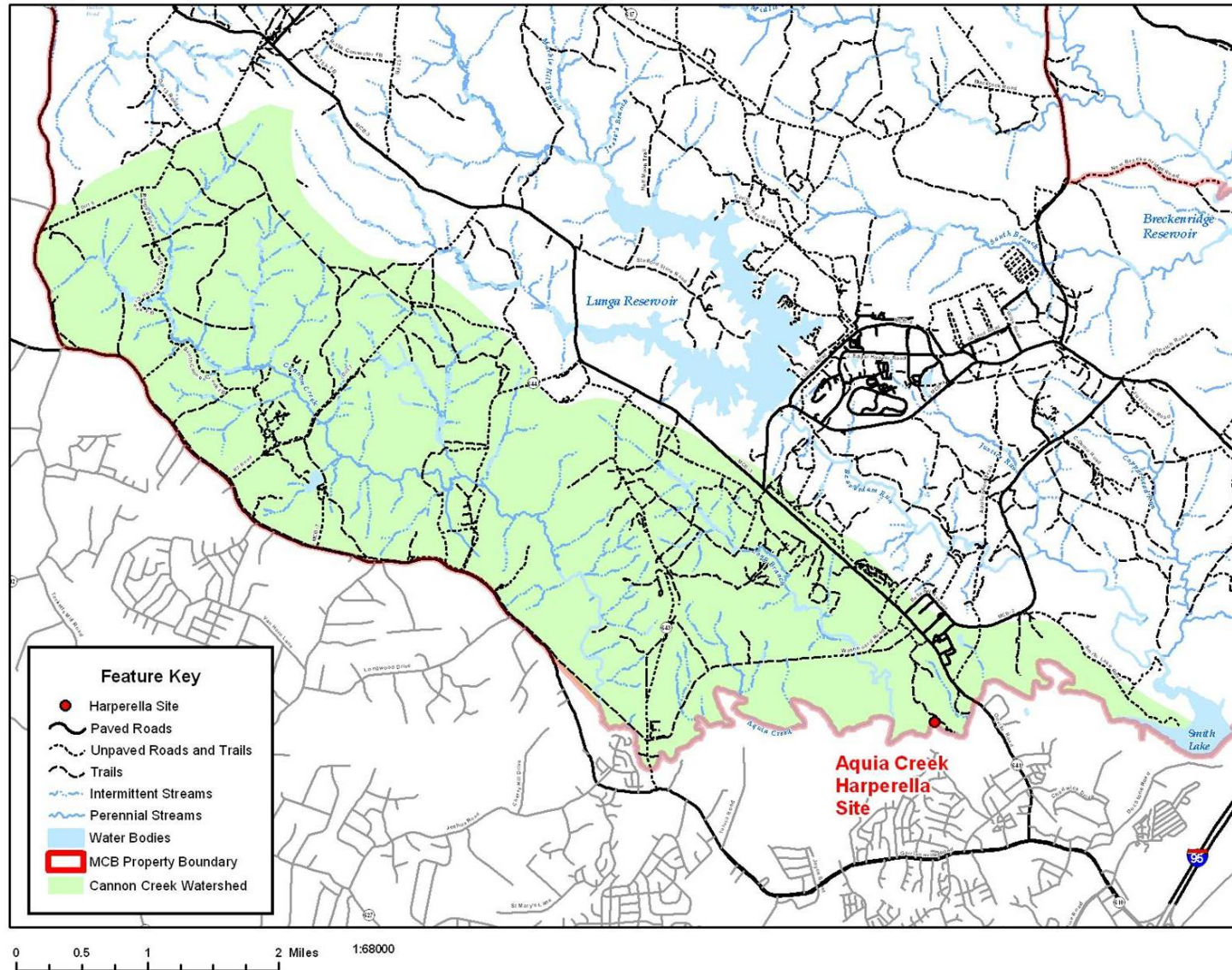
Belden, A. Jr. 2004. Surveys for Harperella (*Ptilimniun nodosum*) at Marine Corps Base, Quantico, Virginia. Natural Heritage Tech. Rep. 04-18. Va. Dept. of Cons. And Rec., Division of Natural Heritage, Richmond. 15pp.

Maddox, D. and R. Bartgis. 1990. Harperella (*Ptilimnium nodosum*) recovery plan. U. S. Fish and Wildlife Service. Newton Corner, MA. 51 pp. lpus appendices.



# INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

MCB Quantico: Harperella Site and Cannon Creek Watershed - April 17, 2006



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# INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

## CHAPTER 7

### THREATENED AND ENDANGERED SPECIES

#### SECTION 6: WORK PLAN

7600. WORK PLAN. Based on the recommendations provided in Sections 1-4 of this chapter, the work plan summary is provided at Table 7-2.

Table 7-2. List of projects, budget and time line for threatened and endangered species management programs. Priority (PRTY) "A" projects maintain the existing program. Priority "B" and "C" projects provide a more comprehensive program.						
DRIVER, GOALS, AND PROJECTS	PRTY	Estimated annual cost in \$1,000 increments				
II. To support and enhance the preservation of all animal and plant life endemic to the Base ecosystem		2007	2008	2009	2010	2011
2. Goal: to promote the preservation and recovery of endangered, threatened and declining native species. <sup>1</sup> Funds are FEFV.						
• Review NEPA documents re: proposed actions. Coordinate with USFWS/VDGIF on actions that may affect T & E species.	A	*	*	*	*	*
• Locate and monitor bald eagle nests.	A	*	*	*	*	*
• Annually visit SWP colonies to count the number of stems and flowers.	A	*	*	*	*	*
• Conduct SWP surveys of all forested lands prior to land disturbances. (FEFV)	A	20	7	7	7	7
• Maintain/install fences, gates or signs at SWP colonies and nest protection zones. (FEFV)	A	1	1	1	1	1
• Monitor dwarfwedge mussel population in Aquia Creek every 5 years.	A	0	5	0	0	0
• Monitor Harperella site annually.	A	*	*	*	*	*
• Conduct 10-year ecology study of SWP micro-habitat and exact stem locations to monitor dormancy and change in colony vigor over time. (FEFV)	C	15	15	15	15	15
<b>Subtotal for "A" projects</b>		<b>21</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>8</b>
<b>Subtotal for "C" projects</b>		<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>
<b>TOTAL</b>		<b>36</b>	<b>27</b>	<b>23</b>	<b>23</b>	<b>23</b>

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